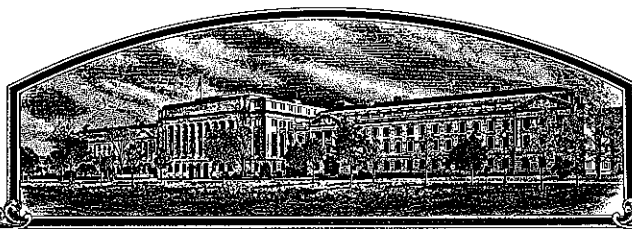


No.



9000192

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

JFR Cooperative

Whereas, THERE HAS BEEN PRESENTED TO THE
Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (AT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'FFR 646'

In Testimony Whereof, I have hereunto set
my hand and caused the seal of the Plant
Variety Protection Office to be affixed
at the City of Washington, D.C.
this 28th day of February in
the year of our Lord one thousand nine
hundred and ninety-two.

Attest

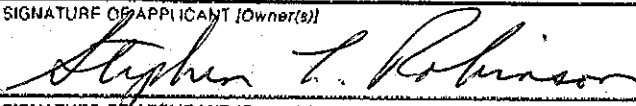
Kenneth Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Edward M. Dignan
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate) FFR Cooperative		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO. X45027	3. VARIETY NAME FFR 646
4. ADDRESS (street and no., or R.F.D. no., city, state, and ZIP) 4112 East State Road 225 West Lafayette, IN 47906		5. PHONE (include area code) 317/567-2115	
6. GENUS AND SPECIES NAME Glycine max		7. FAMILY NAME (Botanical) Leguminosae	
8. CROP KIND NAME (Common Name) Soybean		9. DATE OF DETERMINATION April 1986	
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation			
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Wisconsin		12. DATE OF INCORPORATION 1960	
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Stephen L. Robinson FFR Cooperative 4112 East State Road 225 West Lafayette, IN 47906			
PHONE (include area code): 317/567-2115			
14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)			
a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety			
b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement			
c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of Variety			
d. <input checked="" type="checkbox"/> Exhibit D, Additional Description of Variety			
e. <input checked="" type="checkbox"/> Exhibit E, Statement of the Basis of Applicant's Ownership			
f. <input checked="" type="checkbox"/> Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office <u>4/26/90</u>			
g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,150) made payable to "Treasurer of the United States."			
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act.) <input type="checkbox"/> YES (If "YES," answer Items 16 and 17 below) <input checked="" type="checkbox"/> NO (If "NO," skip to item 18 below)			
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO		17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED	
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? <input type="checkbox"/> YES (If "YES," through <input type="checkbox"/> Plant Variety Protection Act <input type="checkbox"/> Patent Act. Give date: _____) <input checked="" type="checkbox"/> NO			
19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES? <input checked="" type="checkbox"/> YES (If "YES," give names of countries and dates) <input type="checkbox"/> NO			
United States, 1989 released for large increase with sales in 1990			
20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable. The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act. Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.			
SIGNATURE OF APPLICANT (Owner(s)) 		CAPACITY OR TITLE Soybean Research Manager	
SIGNATURE OF APPLICANT (Owner(s))		CAPACITY OR TITLE	
DATE 4-25-90		DATE	

Pedigree: Bedford x Bay

"FFR 646" was developed using a modified single seed descent breeding method. The original cross of "Bedford" x "Bay" was made in 1979 at Marshall, Missouri. The F₁, F₂, and F₃ generations were also handled there. In 1982, the F₄ generation was grown near Jackson, Tennessee and single plants were harvested. The seed from individual F₄ plants was grown in single rows in 1983.

FFR 646, identified as experimental 45027, was first tested in replicated trials in 1984 in three locations. Testing has continued to the present time. FFR 646 was purified using a plant-to-row system with intense selection pressure applied for stem canker disease resistance and resistance to the soybean cyst nematode races 3 and 4. The initial increase was started in 1986 and the purification was done in 1988. Seed from the purification was increased during the winter of 1988-89 and breeder seed production followed in 1989 near Jackson, Tennessee.

FFR 646 appears stable and uniform through 5 generations of self-pollination and during our seed increase and purification program. Flower, pubescence, and hilum color off-types have appeared approximately 1:1000 in the past. An environmentally induced hilum color variant can occur at a frequency of up to 2.5%. The variety is essentially free of all other contaminants at the present time.

Exhibit B. Novelty Statement

9000192

"FFR 646" is most similar to "Hartz 6130"; however, the cultivars differ in the following characteristics:

<u>Trait</u>	<u>Cultivar</u>	
	<u>FFR 646</u>	<u>Hartz 6130</u>
Flower Color	White	Purple
Pod Color	Brown	Tan
Hilum Color	Brown	Black
Lodging Score	1.5	2.0
Seed Protein, %	37.0	37.4
Seed Oil, %	20.4	19.9
G/100 Seed	13.5	11.8

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705




EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (*Glycine max* L.)

NAME OF APPLICANT(S) FFR Cooperative	TEMPORARY DESIGNATION X45027	VARIETY NAME FFR 646
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) 4112 East State Road 225 West Lafayette, IN 47906		FOR OFFICIAL USE ONLY PVPO NUMBER 9000192

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g.,). Starred characters ★ are considered fundamental to an adequate soybean variety description. Other characters should be described when information is available.

1. SEED SHAPE:

<input type="text" value="1"/>			
	1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)		2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
	3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)		4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

★ 2. SEED COAT COLOR: (Mature Seed)

<input type="text" value="1"/>	1 = Yellow	2 = Green	3 = Brown	4 = Black	5 = Other (Specify) _____
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3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

<input type="text" value="1"/>	1 = Dull ('Corsoy 79'; 'Braxton')	2 = Shiny ('Nebsoy'; 'Gasoy 17')
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★ 4. SEED SIZE: (Mature Seed)

<input type="text" value="1"/>	<input type="text" value="4"/>	Grams per 100 seeds
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★ 5. HILUM COLOR: (Mature Seed)

<input type="text" value="3"/>	1 = Buff	2 = Yellow	3 = Brown	4 = Gray	5 = Imperfect Black	6 = Black	7 = Other (Specify) _____
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★ 6. COTYLEDON COLOR: (Mature Seed)

<input type="text" value="1"/>	1 = Yellow	2 = Green
--------------------------------	------------	-----------

★ 7. SEED PROTEIN PEROXIDASE ACTIVITY:

<input type="text" value="1"/>	1 = Low	2 = High
--------------------------------	---------	----------

★ 8. SEED PROTEIN ELECTROPHORETIC BAND:

<input type="text" value="1"/>	1 = Type A (SP1 ^a)	2 = Type B (SP1 ^b)
--------------------------------	--------------------------------	--------------------------------

★ 9. HYPOCOTYL COLOR:

<input type="text" value="1"/>	1 = Green only ('Evans'; 'Davis')	2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')
	3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')	
	4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')	

★ 10. LEAFLET SHAPE:

<input type="text" value="3"/>	1 = Lanceolate	2 = Oval	3 = Ovate	4 = Other (Specify) _____
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11. LEAFLET SIZE:

☐ 21 = Small ('Amsoy 71'; 'A5312')
3 = Large ('Crawford'; 'Tracy')

2 = Medium ('Corsoy 79'; 'Gasoy 17')

12. LEAF COLOR:

☐ 21 = Light Green ('Weber'; 'York')
3 = Dark Green ('Gnome'; 'Tracy')

2 = Medium Green ('Corsoy 79'; 'Braxton')

★ 13. FLOWER COLOR:

☐ 1

1 = White

2 = Purple

3 = White with purple throat

★ 14. POD COLOR:

☐ 2

1 = Tan

2 = Brown

3 = Black

★ 15. PLANT PUBESCENCE COLOR:

☐ 2

1 = Gray

2 = Brown (Tawny)

16. PLANT TYPES:

☐ 21 = Slender ('Essex'; 'Amsoy 71')
3 = Bushy ('Gnome'; 'Govan')

2 = Intermediate ('Amcor'; 'Braxton')

★ 17. PLANT HABIT:

☐ 1

1 = Determinate ('Gnome'; 'Braxton')

2 = Semi-Determinate ('Will')

3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

★ 18. MATURITY GROUP:

☐ 0 ☐ 91 = 000
9 = VI2 = 00
10 = VII3 = 0
11 = VIII4 = I
12 = IX5 = II
13 = X

6 = III

7 = IV

8 = V

★ 19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

★

☐ 0Bacterial Pustule (*Xanthomonas phaseoli* var. *sojensis*)

★

☐ 0Bacterial Blight (*Pseudomonas glycinea*)

★

☐ 0Wildfire (*Pseudomonas tabaci*)

FUNGAL DISEASES:

★

☐ 0Brown Spot (*Septoria glycines*)Frogeye Leaf Spot (*Cercospora sojae*)

★

☐ 0

Race 1

☐ 0

Race 2

☐ 0

Race 3

☐ 0

Race 4

☐ 0

Race 5

☐

Other (Specify)

☐ 0Target Spot (*Corynespora cassicola*)☐ 0Downy Mildew (*Peronospora trifoliorum* var. *manshurica*)☐ 0Powdery Mildew (*Microsphaera diffusa*)

★

☐ 0Brown Stem Rot (*Cephalosporium gregatum*)☐ 2Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

FUNGAL DISEASES: (Continued)

- ★ ☐ 0 Pod and Stem Blight (*Diaporthe phaseolorum* var. *sojae*)
- ☐ 0 Purple Seed Stain (*Cercospora kikuchii*)
- ☐ 0 Rhizoctonia Root Rot (*Rhizoctonia solani*)
- Phytophthora Rot (*Phytophthora megasperma* var. *sojae*)
- ★ ☐ 1 Race 1 ☐ 1 Race 2 ☐ 1 Race 3 ☐ 1 Race 4 ☐ 1 Race 5 ☐ 1 Race 6 ☐ 1 Race 7
- ☐ 1 Race 8 ☐ 1 Race 9 ☐ Other (Specify) _____

VIRAL DISEASES:

- ☐ 0 Bud Blight (Tobacco Ringspot Virus)
- ☐ 0 Yellow Mosaic (Bean Yellow Mosaic Virus)
- ★ ☐ 0 Cowpea Mosaic (Cowpea Chlorotic Virus)
- ☐ 0 Pod Mottle (Bean Pod Mottle Virus)
- ★ ☐ 0 Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

- Soybean Cyst Nematode (*Heterodera glycines*)
- ★ ☐ 0 Race 1 ☐ 0 Race 2 ☐ 2 Race 3 ☐ 2 Race 4 ☐ Other (Specify) _____
- ☐ 0 Lance Nematode (*Hoplolaimus Colombus*)
- ★ ☐ 2 Southern Root Knot Nematode (*Meloidogyne incognita*)
- ★ ☐ 0 Northern Root Knot Nematode (*Meloidogyne Hapla*)
- ☐ 1 Peanut Root Knot Nematode (*Meloidogyne arenaria*)
- ☐ 0 Reniform Nematode (*Rotylenchulus reniformis*)
- ☐ OTHER DISEASE NOT ON FORM (Specify): _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

- ★ ☐ 0 Iron Chlorosis on Calcareous Soil
- ☐ Other (Specify) _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

- ☐ 0 Mexican Bean Beetle (*Epilachna varivestis*)
- ☐ 0 Potato Leaf Hopper (*Empoasca fabae*)
- ☐ Other (Specify) _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	Bedford	Seed Coat Luster	Essex
Leaf Shape	Bay	Seed Size	Essex
Leaf Color	Bedford	Seed Shape	Essex
Leaf Size	Centennial	Seedling Pigmentation	Bedford

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/ POD
				CM Width	CM Length	% Protein	% Oil		
Submitted	135	1.5	93.5	6.3	8.1	37.0	20.4	13.5	
Hartz 6130 Name of Similar Variety	135	2.0	92.7	5.2	8.4	37.4	19.9	11.8	

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell, 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A₂ in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris, 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

Exhibit D. Additional Description of Variety

"FFR 646" is a determinate, maturity group VI soybean variety. It has white flowers, tawny pubescence, brown pods, yellow seedcoats, and brown hilum. It is resistant to races 3 and 4 of the soybean cyst nematode (Heterodera glycines) and has shown good levels of resistance to the Southern Root Knot nematode (Meloidogyne incognita). It also has demonstrated a high level of resistance to the soybean stem canker disease (Diaporthe phaseolorum var. caulivora) and has been rated resistant to frogeye leafspot (race(s) not determined) in the field.

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Exhibit E. Statement of the Basis of Applicant's Ownership

"FFR 646" was bred and developed by a number of plant breeders employed by FFR Cooperative.